

Remarks

Claims 1-40 are pending in the application. Claims 1, 4-11, 14-21, 24-31 and 34-40 are rejected under 35 U.S.C. §102(b) as being anticipated by Armistead, U.S. Patent No. 5,838,759.. Claims 2, 3, 12, 13, 22, 23, 32 and 33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Armistead

In the forgoing Amendments, Claims 1-40 are cancelled, and Claims 41-193 are newly presented. The requisite extra claim fee is submitted concurrently herewith.

In asserting the above rejection under 35 USC §102(b), the outstanding Office Action asserts that Armistead discloses an inspection system including an x-ray source 14, 113 or 157, for generating a neutron induced gamma ray spectroscopy, and a plurality of detectors 24 or 158 for detecting fissile or radioactive material in a cargo container 12 being hoisted by a robotic arm 155 on a straddle carrier vehicle 151. The x-ray source and detectors are located on a moving crane vehicle 111, 151 that operates to detect the presence of the radioactive material the in cargo container. The outputs of the x-ray detectors are fed to a computer with programming software and codes associated with the gamma ray energy analyzer 34, target identifier 36, data memory and a display 36. The target identifier identifies radioactive materials based on the detected output signals compared with a predetermined threshold energy for the photo neutron reaction. The x-ray image always takes image signals of the target material in the container and the target material will be displayed if the target material is exceeding threshold energy level.

The outstanding Office Action makes the further assertion that the gamma rays in the image signals are like the fingerprints of the target material. For reasons as set forth below, Applicants respectfully disagree.

Armistead is directed to an apparatus and method to determine the presence of potentially contraband material within a shipping container by ascertaining the characteristic energy level peaks of a known contraband in a target material that has been previously identified as suspect

within the container. More specifically, as disclosed in Armistead, when an ocean going cargo container, typically made of corrugated steel, is pulled along a conveyor by a towing hook into the disclosed inspection system, a two tiered process first identifies the target material as being possible contraband in and subsequently obtains data relating to gamma ray energy levels induced from the bombardment of thermal neutrons upon the target material.

More specifically, in the first tier of the inspection process, a collimated x-ray beam directed towards a detector array upon the moving container tripping a sensor. As the container is moved is its scanned by the collimated beam, of sufficient energy to transverse the container, such that an x-ray image of the container contents is obtained. In particular, the detector array records a series of snapshots of associated slices of the container that are stitched together to form a complete image of the container contents. If the x-ray image does not indicate a suspect item in the container, then the container is deemed to have passed the inspection. Otherwise, the second tier of the inspection process is performed. See Armistead, generally at 4:7-5:34.

In the second tier of the inspection process, the container is moved into a position such that the x-ray beam generator is pointed specifically at the suspect item, which may be a suspicious shape, density or compartment identified within the cargo container. A beryllium converter plate is next placed in front of the x-ray generator to convert the generated x-ray beam to a beam of neutrons. The neutrons penetrate the container wherein they are thermalized. The thermal neutrons are then absorbed by the various materials in the container and give off gamma rays of characteristic energy. Gamma ray detectors are then focused on the container to sample the characteristic gamma rays such that the presence and amounts of various elements may be detected. See, for example, Armistead at 5:45-6:1.

More particularly, the neutron beam produces gamma ray fluorescence from neutron activation of specific atoms. The output signal from the energy dependent gamma ray detectors provides information about the type and amount of materials that are present. In particular, the gamma ray energy identifies the material and the relative count rate is related to the quantity of the material. The detector signals are transmitted to an energy analyzer, for example a

spectrometer, which is looking for energy peaks characteristic of neutron interactions with particular atoms, as described in Armistead at 6:41-50.

In contrast thereto, in Applicants' invention as set forth in each of the independent Claims 41, 92 and 143, a container fingerprint is developed as being derived from gamma rays detected about a container. As set forth in the present application, "fingerprint" is defined as the gathered and digitized gamma ray data. The container fingerprint is compared to a predetermined fingerprint, wherein the predetermined fingerprint corresponds to a known sample of radioactive or fissile material. The comparing of the container fingerprint to the predetermined fingerprint is to determine whether the container fingerprint and the predetermined fingerprint heuristically match. Also as set forth in the present application, "to match heuristically" means to compare patterns of digitized data, determine their similarity with a high degree of certainty while not requiring an exact match. In the event the container fingerprint and the predetermined fingerprint heuristically match, it may then be indicated that the container contains the known radioactive or fissile material.

An important feature of Applicants' invention, as set forth in Claims 41, 92 and 143, is that the container fingerprint has been derived from gamma rays detected about the container. Accordingly, the gamma rays include all of the inherent radiation of the container itself, the radiation emitted from any of the contents contained within the container, as well as any other gamma rays naturally occurring in the environment about the container. As set forth immediately below, this feature of the container fingerprint of Applicant's invention, as set forth in Claims 41, 92 and 143, is not anticipated or disclosed by Armistead.

In fact, Armistead discloses the exact opposite in its two tier process. It is only in the first tier of the process that Armistead looks at the container in its entirety (and it could be said the environment about the container) during the taking of the x-ray slices of the container to develop an x-ray image. Contrary to any such suggestion in the outstanding Office Action, the x-ray image of Armistead is not an equivalent to the container fingerprint, required in Claims 41,

92 and 143, as defined above. Accordingly, Applicant's container fingerprint of Claims 1, 92 and 143, is an element and limitation that is not disclosed, taught or suggested by Armistead.

In further contrast to the container fingerprint as defined in Applicants' Claims 41, 92 and 143, Armistead specifically requires that gamma rays be only detected from specifically identified suspect material or contraband within the container. This requirement of Armistead is contrary to and teaches away from Applicant's container fingerprint. Accordingly, any gamma ray data obtained from a specifically identified suspect material or contraband within the container cannot be deemed to disclose, teach or suggest the container fingerprint as required by Applicants' invention as set forth in Claims 41, 92 and 143.

Another feature of Applicants' invention as set forth in Claims 41, 92 and 143, is that a comparison is made between the container fingerprint and a predetermined fingerprint of a known sample of radioactive or fissile material to determine if a heuristic match exists therebetween. As set forth immediately below, this feature of the container fingerprint of Applicant's invention, as set forth in Claims 41, 92 and 143, is not anticipated or disclosed, by Armistead.

Again, Armistead teaches otherwise. Armistead does not require any comparison be made between the container fingerprint and the predetermined fingerprint as required in Claims 41, 92 and 143. Contrary to any suggestion in the outstanding Office Action in which it is asserted that different gamma ray fingerprints are stored in a database 30, Armistead does not store any such fingerprints or even rely upon the use of any fingerprint to which a container fingerprint is compared. Instead, Armistead only stores x-ray images in the database 30 for comparison to the x-ray image of the container. As stated above, this x-ray image is not a predetermined fingerprint of a known sample of radioactive or fissile material in Claims 41, 92 and 143. Accordingly, Armistead does not disclose, teach or suggest the predetermined fingerprint as required by Applicants' Claims 41, 92 and 143.

In further contrast to Applicants' invention as set forth in Claims 41, 92 and 143, Armistead, at 6:41-60, discloses that the output signal from the gamma ray detector, which is only measuring gamma rays from the identified suspect material or contraband and not the container as a whole, is applied to a spectrometer that looks for energy peaks characteristic of neutron interactions with particular atoms. From these peaks, the target identifying electronics 36 of Armistead "associates" the energy found in the gamma rays from the suspect material to particular substances and then counts the number of sample signals. From this sample, a statistical projection is made whether the suspect material is contraband of the particular substance. Nowhere does Armistead disclose that this association is a comparison of one item of data to another item of data, as such is the nature of each of the container fingerprint and the predetermined fingerprint. In fact, the count of the sample signals after identification of the energy peaks is contrary to and teaches away from the comparison of Applicants' Claims 41, 92 and 143. Accordingly, Armistead does not disclose, teach or suggest the comparison of the container fingerprint to the predetermined fingerprint as required by Applicants' Claims 41, 92 and 143.

Applicants respectfully submit that none of the container fingerprint, the predetermined fingerprint and the comparison made between each of them is disclosed, taught or suggested by Armistead. Therefore, based on the forgoing Applicants respectfully submit that Claims 41, 92 and 143 are not anticipated nor rendered obvious over Armistead.

Applicants' invention, as set forth in dependent Claims 47, 98, and 149, which respectively depend ultimately from Claims 41, 92 and 143, has a database that stores the above mentioned predetermined fingerprints. As mentioned above, Armistead stores x-ray images of known objects in a database for comparison to x-ray images obtained from the container. It is respectfully submitted that the database of Armistead does not disclose, teach or suggest the database which stores the predetermined fingerprints as set forth in Claims 47, 98, and 149. Therefore, based on the forgoing Applicants respectfully submit that Claims 47, 98, and 149 are not anticipated nor rendered obvious over Armistead.

Applicants' invention, as set forth in dependent Claims 57, 108, and 159, which respectively depend ultimately from Claims 41, 92 and 143, specifies that the gamma rays that exists about the container, from which the container fingerprint is derived, exists in the absence of absorption of thermal neutrons. Again, the disclosure and teachings of Armistead are contrary to Applicants' invention. Specifically, Armistead states, at 6:24-27, the particular importance of the gamma ray detection system being sensitive only to those gamma rays that are emitted only by thermal neutron absorption. Therefore, based on the forgoing Applicants respectfully submit that Claims 57, 108, and 159 are not anticipated nor rendered obvious over Armistead.

In Applicants invention as set forth in independent Claims 58, 109 and 160, a container fingerprint is developed as being derived from gamma rays detected about a container. The container fingerprint is compared to a purported fingerprint, wherein the purported fingerprint is identified as corresponding to a standardized commodity ID on a manifest associated with the container. The comparing of the container fingerprint to the purported fingerprint is to determine whether the container fingerprint and the purported fingerprint heuristically match. In the event the container fingerprint and the purported fingerprint heuristically match, it may then be indicated that the container contains contents identified by the standardized commodity ID. Since Armistead does not disclose, teach or suggest this purported fingerprint, and further in absence of any other reference, Applicants respectfully submit that Claims 58, 109 and 160 are not anticipated nor rendered obvious over Armistead.

In Applicants' invention as set forth in each of the independent Claims 75, 126 and 177, a container fingerprint is developed as being derived from gamma rays detected about a container. The container fingerprint is compared to a background fingerprint, which as described in the present application, has been obtained from gamma rays about an empty container. The comparing of the container fingerprint to the background fingerprint is to determine whether the container fingerprint is substantially lower than the background fingerprint. In the event the container fingerprint is substantially lower than the background fingerprint, it may then be indicated that the container contains radiation shielding material. Applicant respectfully submits that the background fingerprint is not the background radiation as described in Armistead.

In contrast to Applicants' invention as set forth in Claims 75, 126 and 177, Armistead specifically discloses, at 6:33-35, the needs to shield the detectors so that inherent background radiation does not obscure the signal derived from the thermal neutron induced gamma ray fluorescence of the suspect material. However, Applicants use this inherent background radiation, not only to normalize fingerprints as set forth in various dependent claims, but to provide a background fingerprint from which a determination can be made, as set forth in Claims 75, 126 and 177. In brief, Applicants utilize background radiation to derive a background fingerprint; Armistead needs to eliminate background radiation. Since Armistead does not disclose, teach or suggest this background fingerprint, and further in absence of any other reference, Applicants respectfully submit that Claims 75, 126 and 177 are not anticipated nor rendered obvious over Armistead.

The inventive concepts in each set of independent Claims 41, 92 and 143, Claims 58, 109 and 160 and Claims 75, 126 and 177, are furthermore dependently claimed from each other set of independent claims. For reasons set forth above, Applicants respectfully submit that all such dependent claims are neither anticipated nor rendered obvious over Armistead.

Applicant respectfully submits that the above-identified application is now in condition for immediate allowance. An action recognizing the patentability of the forgoing Claims is accordingly solicited.

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Respectfully submitted,



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